NCCARF
National
Climate Change Adaptation
Research Facility

National Climate Change Adaptation Research Plan: Freshwater Biodiversity

Summary

A research plan has been developed by the National Climate Change Adaptation Research Facility to identify critical gaps in the information available to address the potential impacts of climate change on freshwater biodiversity.

The National Climate Change Adaptation Research Plan for Freshwater Biodiversity supports efforts to identify climate adaptation research priorities for freshwater species and ecosystems. The research will support governments, conservation agencies, landowners, community organisations and individuals to implement effective climate change adaptation initiatives. These initiatives will take advantage of opportunities for freshwater biodiversity that result from climate change, and reduce unavoidable detrimental climate change impacts.

The Plan identifies a research program for the next 5-7 years.

Climate change will alter the basic physical and chemical environment underpinning all life. These changes will have different effects between species and change the structure and composition of present-day freshwater ecological communities. This can change the ways these ecosystems function and the services they provide. In the context of the Plan, the term Freshwater encompasses fresh and saline lakes, creeks, streams, wetlands, groundwater aquifers and discharges, marshes, bogs, swamps, ponds, rivers and estuaries.

Adaptation research for freshwater biodiversity is fundamentally about generating information, knowledge and tools to determine:

- Why, and how freshwater species and ecosystems are vulnerable to, or able to benefit from, climate change
- What their capacity to adapt might be
- How their capacity to adapt can be increased
- How the management of freshwater biodiversity can integrate climate change information, knowledge and tools
- What the implications of this integration are for policies, plans and on-ground management of freshwater biodiversity.

Adaptation requires research that connects across disciplines. It needs to address stakeholder understanding, institutional factors, management practices and end user needs, as well as the biophysical and technical aspects of climate change adaptation.

Adaptation must take account of factors that already impact freshwater biodiversity and how they may be affected by climate change. It must consider new factors that may result from climate change impacts and from society's responses to climate change.

Current factors include the effects of water diversion and catchment management projects on water quality and quantity; future factors may include water use by increased forest development associated with carbon sequestration initiatives.

Climate change impacts in Australia: priorities for freshwater biodiversity

This Plan identifies five broad areas of research and priority research questions for each area.

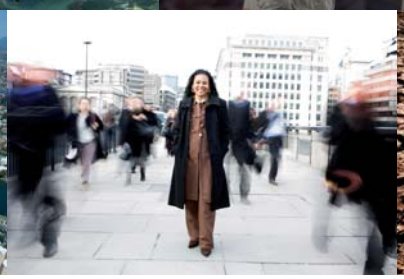
This document provides a summary of the National Climate Change Adaptation Research Plan for Freshwater Biodiversity; the full Plan is available for download from www.nccarf.edu.au

Climate change will affect Australia's freshwater biodiversity in highly variable ways, depending on the types and locations of both climate impacts, and freshwater species and ecosystems. Adaptation responses to climate change impacts will be required in response to the specific effects experienced, together with the challenges they present in terms of opportunities and detrimental impacts in each location.










Climate change adaptation and freshwater biodiversity: priority research questions

Incorporate climate change adaptation into management of freshwater species and ecosystems.

- What management options will conserve freshwater species and ecosystems that are currently at or near their climate limits? (very high)
- What attributes will enable freshwater species to adapt and ecosystems to successfully change autonomously in response to climate change? (very high)
- How will climate change alter current freshwater biodiversity management effectiveness, and what management changes will be required, including for poorly understood species and ecosystems?

Identify climate change adaptation options for Australia's freshwater biodiversity refugia.

- How can the climate resilience of freshwater biodiversity refugia be increased? (very high)
- What changes to Australia's conservation reserve system are required to improve protection of current and projected climate refugia and to support connectivity for freshwater biodiversity? (very high)
- What adaptation options will facilitate the type and level of connectivity and dispersal required under climate change impacts?

Understand climate change adaptation interactions between freshwater biodiversity and other sectors.

- How will climate change impacts on other sectors affect existing stressors on freshwater biodiversity?
- How can current non-climate stressors on freshwater biodiversity be managed or reduced to minimise the synergistic effects of climate and non-climate stressors? (very high)
- What integrated climate change adaptation response plans at the local, landscape, catchment and regional scales will build the resilience of freshwater biodiversity, and also terrestrial biodiversity, primary industries, water resources and associated communities and industries?

Understand the role of environmental policies in protecting freshwater biodiversity under changing climate conditions.

- How will climate change affect existing conservation goals, policies and programs for freshwater biodiversity including meeting Australia's international obligations? (very high)

Cross-cutting theme: Ensure that adaptation initiatives for freshwater biodiversity and other sectors are mutually supportive and integrated where appropriate.

- What climate change adaptation and mitigation actions taken in other sectors will benefit freshwater biodiversity?

Developing the Plan

The writing team for the National Climate Change Adaptation Research Plan for Freshwater Biodiversity was led by Professor Stuart Bunn, and Dr Bryson Bates. The team comprised Australia's leading specialists working in the area of freshwater biodiversity, including Peter Baker, Malcolm Cox, Angas Hopkins, Bill Humphreys, Sam Lake, Garry Willgoose and Bill Young, with contributions from Brendan Edgar and Mark Kennard.

The National Climate Change Adaptation Research Facility coordinated the development of the Plan Workshops with stakeholders from research, government and non-government agencies were conducted to contribute to the development of the research priorities that underpin this Plan.

A formal period of review of the draft Plan provided an opportunity for all interested parties to provide input into the final Plan.

Criteria for prioritising research questions

Identified research questions were evaluated and prioritised using the following criteria:

- Severity of potential impact to be avoided or degree of potential benefit to be derived
- Immediacy of required intervention or response
- Need to change current intervention and practicality of alternative intervention
- Potential for co-benefit
- Cross-sectoral relevance
- Equity considerations.

A coordinated national approach to climate change and freshwater biodiversity research in Australia

The implementation of the National Climate Change Adaptation Research Plan for Freshwater Biodiversity will be supported by the NCCARF Adaptation Research Network for Water Resources and Freshwater Biodiversity, which is funded by the Australian Government via the National Climate Change Adaptation Research Facility. It is hosted by Griffith University and convened by Professor Stuart Bunn.

The aim of both the Plan and the Network is to facilitate a coordinated research effort to address the information needs of decision makers. The Network will play an essential role in implementing the research plan and will contribute greatly to building collaboration, information sharing and research capacity across the Australian research community.

The Australian Government Department of Climate Change and Energy Efficiency has made available initial funding of $1.9 million towards implementing the Plan, with further investment anticipated from other federal, local and state government agencies, natural resource management organisations and non-government sources.

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How to get involved: key contacts

If you would like further information about the National Climate Change Adaptation Research Plan for Freshwater Biodiversity please contact:

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